PÓS-GRADUAÇÃO EM BIOLOGIA DE FUNGOS, ALGAS E PLANTAS
CENTRO DE CIÊNCIAS BIOLÓGICAS
UNIVERSIDADE FEDERAL DE SANTA CATARINA
88040-900, Florianópolis
EDITAL No 01/PPGFAP/2024

AVALIAÇÃO ESCRITA

1. Identifique a avaliação apenas com o número do edital e o número de inscrição do(a/e) candidato(a/e). O número de inscrição está na ficha de inscrição. As avaliações não podem ter o nome do(a/e) candidato(a/e), nem qualquer assinatura que identifique o(a/e) candidato(a/e). A correção será feita às cegas. Avaliações com identificação nominal levarão à desclassificação do(a/e) candidato(a/e).

2. Esta avaliação tem 3 (três) perguntas e o (a/e) candidato(a/e) deverá escolher 2 (duas) perguntas para responder. A avaliação é eliminatória e a nota final das 2 (duas) perguntas será de 0 a 10. O (a/e) candidato(a/e) será aprovado para a próxima etapa se alcançar nota igual ou superior a seis (6,0). Os critérios de avaliação das respostas estão descritos no edital 01/PPGFAP/2024, item 4.3.

3. As respostas devem ser identificadas com o número da pergunta, sem a necessidade de copiar todo o enunciado. A avaliação respondida deve ser encaminhada em um único arquivo, identificado pelo número de inscrição do(a/e) candidato(a/e). O arquivo deve ser gravado no formato .pdf e conter no máximo 4 (quatro) laudas, com margens de 2 cm, fonte Arial ou Times New Roman, tamanho 12, espaçamento 1,5. Avaliações encaminhadas em outro formato serão desclassificadas.

4. O documento deverá conter, no final, a seguinte declaração sobre a autenticidade e inexistência de plágio nas respostas: *"Declaro que o texto apresentado acima, com exceção de citações diretas e indiretas claramente indicadas e referenciadas, foi escrito inteiramente e tão somente por mim e, portanto, não contém plágio. Estou consciente que a utilização de material de terceiros, incluindo uso de paráfrase sem a devida indicação das fontes, será considerado plágio, e estarei sujeito(a) à desclassificação no Processo de Seleção do edital 01/PPGFAP/2024."* Este trecho não será contabilizado na quantidade de laudas mencionada no item "III" (pode estar em uma quinta lauda).

5. O arquivo no formato .pdf deverá ser enviado ao e-mail do PPGFAP (ppgfap@contato.ufsc.br) até às 11h00 do dia 17 de junho de 2024. As avaliações recebidas após este horário resultarão na desclassificação do(a/e) candidato(a/e).

<u>Questão 1.</u> Texto e imagem retirados do trabalho: **Ciccarelli & Bona, 2022. Exploring the Functional Strategies Adopted by Coastal Plants Along an Ecological Gradient Using Morpho-functional Traits. *Estuaries and Coasts*, 45:114–129.**

"Coastal dunes are characterized by strong interactions between biotic and abiotic factors along a short gradient from the shoreline to the inland region. We carried out an ecological analysis of the vegetation in a protected area of the Italian coast to evaluate the relationships among species abundance, the occurrence of morphoanatomical traits related to leaves, stems, and roots, and soil variables. Three transects were established perpendicular to the shoreline, with 27 plots distributed in the frontal dunes, backdunes, and temporarily wet dune slacks. An analysis based on community-weighted mean values showed that the pioneer communities of the frontal dunes were dominated by ruderals that are well adapted to the harsh ecological conditions of these environments, showing succulent leaves, high limb thickness values, and low values for leaf dry matter content (LDMC). The backdune vegetation was a mosaic of annual herbaceous and perennial shrub communities showing both ruderal and stress tolerant strategies (clonality, sclerified leaves, high LDMC values, root phenolics) consistent with less extreme ecological conditions. The dune slack areas were dominated by plants showing adaptations to both arid and flooded environments, such as C4 photosynthesis, amphistomatic leaves, and abundant aerenchyma in the roots. The invasive status, C4 photosynthesis, leaf trichomes, and aerenchyma in the roots were significantly correlated with soil humidity, organic matter content, and pH. These results demonstrate the usefulness of anatomical traits (including root system traits) in understanding the functional strategies adopted by plants. Invasive species tended to occupy plots with high levels of soil moisture, suggesting an avoidance strategy for the harsh environmental conditions of coastal sand dunes. Finally, we suggest including information regarding root systems into coastal monitoring programs because they are directly linked to soil parameters useful in coastal dune management and protection."

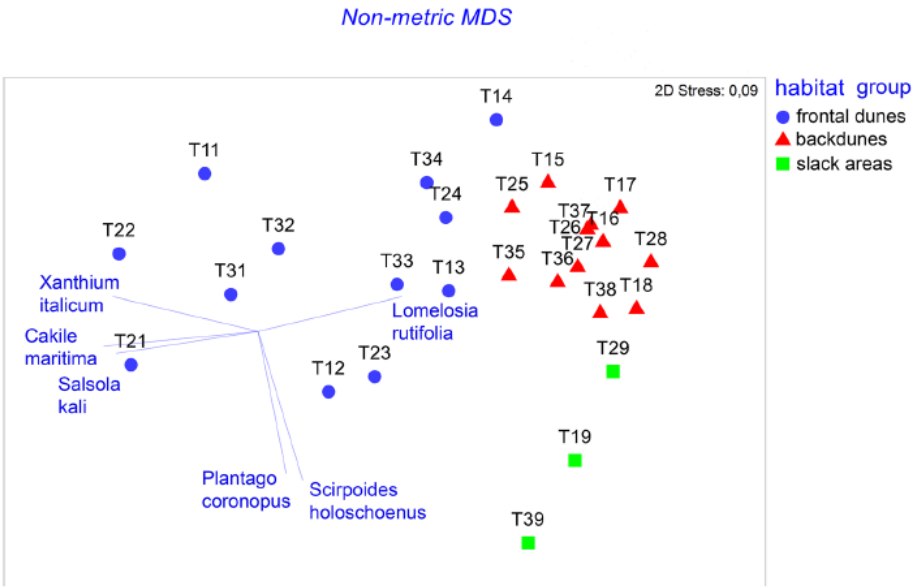

Fig. 2 Non-metric multidimensional scaling diagram based on the similarity (measured by the Bray-Curtis index) among the plots. Different habitat groups are indicated with different symbols and colours. Abbreviations of the sampling localities: T11–T19, plots 1–9 of transect 1; T21–T29, plots 1–9 of transect 2; T31–T39, plots 1–9 of transect 3. All shown plant taxa have a Pearson correlation coefficient >0.7 with the two axes

Pergunta: Com base no texto e gráfico acima apresentados quais são os grupos de plantas e quais suas respectivas estratégias funcionais que permitem sua sobrevivência nos diferentes microambientes estudados?

<u>Questão 2</u>. Leia os fragmentos de texto e imagens obtidas do trabalho: **Jeiter, J. & Smets, E., 2023. Integrating comparative morphology and development into evolutionary research. *Taxon,* 72 (4): 724–732.**

"*Only the comparison of homologous characters is meaningful for understanding evolution since these traits are resulting from common ancestry (Ochoterena & al., 2019). As is the case for an organism, individual features of such an organism follow a pattern of development (also called ontogeny) throughout their existence. It is frequently occurring, however, that two different organisms apparently display similar characters at maturity, but that these characters are resulting from different developmental processes which leads to homoplasy* (Fig. 1)."

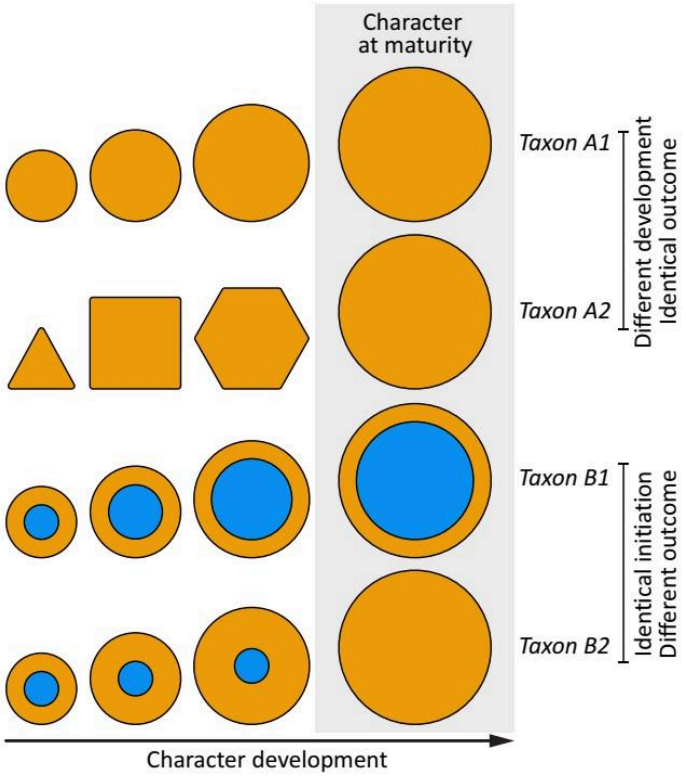

Fig. 1. Characters might appear identical at maturity, but differ profoundly in their development or ontogeny. In order to arrive at well-defined characters, all information must be considered and the ontogeny must also be investigated.

"In some flowering plant species, a tubular outgrowth of flowers containing nectar, called a spur, evolved to attract and reward pollinators. Spurs evolved independently in several taxa and on a variety of floral organs. For instance, spurs formed by the receptacle can be found in Tropaeolum L. (Tropaeolaceae Juss.; Ronse De Craene & Smets, 2001) (Fig. 4A,D); sepal spurs are a common character in Impatiens L. (Balsaminaceae A.Rich.; Janssens & al., 2012) (Fig. 4B,E); and petal (or corolla) spurs can be found in several taxa of the eudicots (Endress & Matthews, 2006), such as the genus Nemesia Vent. (Scrophulariaceae Juss.) (Fig. 4C,F)."

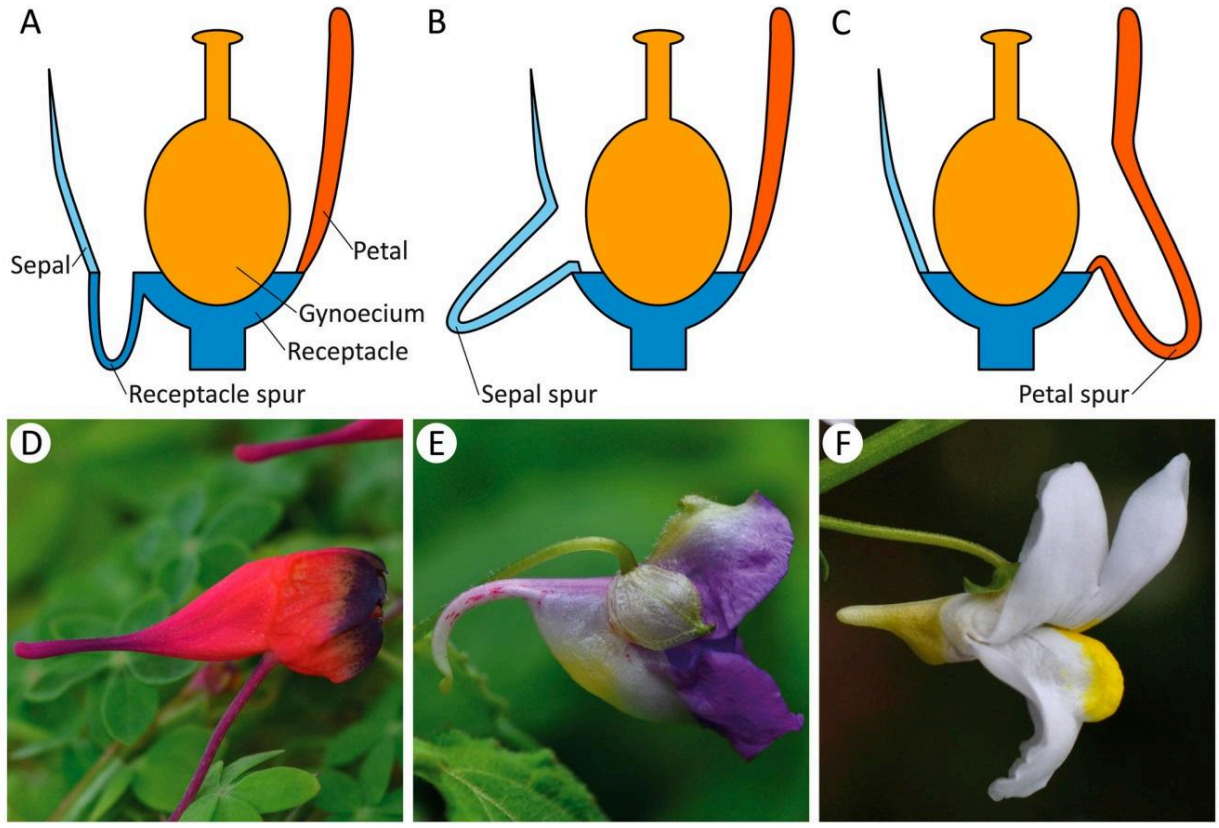

Fig. 4. Illustration of three non-homologous spur types. **A–C**, Schematic drawings of spurs (stamens not shown): **A**, Receptacle spur; **B**, Sepal spur; **C**, Petal spur. **D–F**, Examples of different spur types: **D**, Receptacle spur in *Tropaeolum tricolorum* Sweet; **E**, Sepal spur in *Impatiens uniflora* Hayata; **F**, Petal/corolla spur in *Nemesia fruticans* Benth. — Images: J. Jeiter.

Com base nos textos e nas figuras percebemos que um órgão vegetal completamente desenvolvido pode trazer caracteres morfológicos que podem conduzir a interpretações errôneas nas relações de parentesco entre as espécies. Conceitue homologia, e o termo usado para definir estruturas não homólogas. Apresente alguma(s) forma(s) de contornar esse problema bastante comum na sistemática de plantas.

Questão 3. De acordo com as informações da figura abaixo, discorra sobre o desenvolvimento de plantas associadas a micorrizas. Considerando os ambientes característicos de floresta ombrófila e de restinga, em qual deles você acha que uma planta se beneficiaria mais de uma associação com micorrizas? Explique sua resposta considerando os aspectos bióticos e abióticos de cada ecossistema.

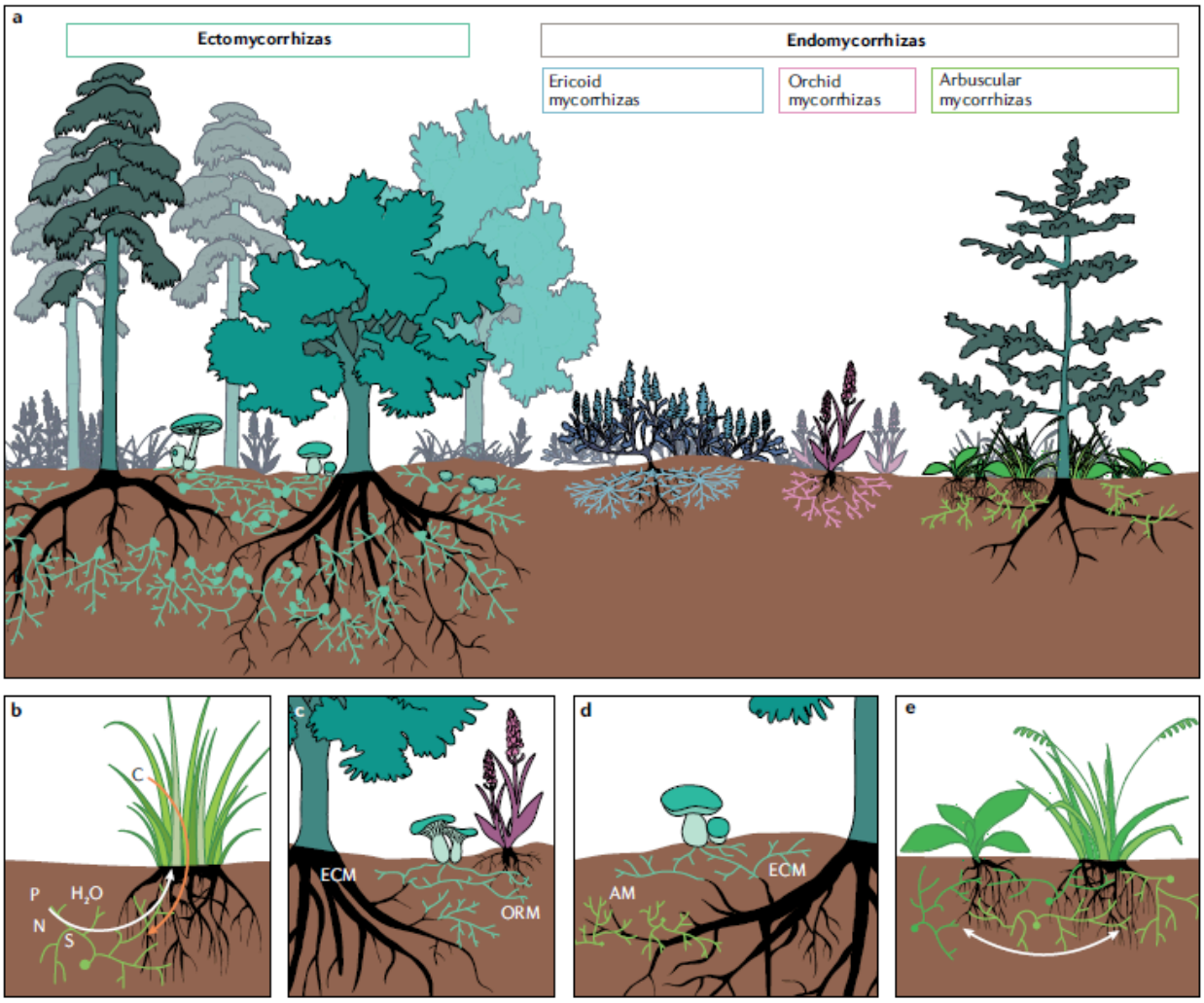

Fig. 1 | **Major mycorrhizal types. a** | The major morphological distinctions between ectomycorrhizas (ECM), mostly involving trees and shrubs, and endomycorrhizas, which include ericoid mycorrhizas (restricted to the Ericaceae), orchid mycorrhizas (ORM) (limited to the Orchidaceae) and the more widespread arbuscular mycorrhizas (AM). **b** | The reciprocal exchange of nutrients in the mutualistic mycorrhizal symbiosis is shown. In AM, organic carbon fixed by the plant through photosynthesis is transferred to the fungus in exchange for soil-derived water and inorganic compounds containing phosphorus (P), nitrogen (N), sulfur (S) and other essential nutrients. **c** | A few fungal species, such as *Russula* sp., develop different types of mycorrhizal interactions: ECM with a tree species and ORM with an orchid, in this case. **d** | The opposite situation is shown, where a single plant host (such as poplar) can develop both AM and ECM. **e** | The formation of a common mycorrhizal network within plant communities is shown, where the fungal hyphae colonize and connect the roots of different plants, allowing the exchange of nutrients and signals.